



## Brown & Root Environmental

A Division of Halliburton NUS Corporation

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C-49-07-8-006

### MINUTES OF RESTORATION ADVISORY BOARD (RAB) MEETING

To: NSB-NLON RAB Meeting Attendees and RAB Members (See attached Distribution list)

From: Corey Rich of Brown & Root Environmental *CR*

Date: July 7, 1998

Subject: RAB Meeting Minutes – May 6, 1998  
Installation Restoration Program  
Naval Subbase - New London (NSB-NLON)  
Groton, Connecticut

#### Attendees of the Meeting

Jeffery Sullivan	NSB-NLON
Richard Conant	NSB-NLON
Andy Stackpole	NSB-NLON
Mark Evans	Navy
Greta Deirocini	Navy
Kymberlee Keckler	EPA
Patti Tyler	EPA
Mark Lewis	CTDEP
Corey Rich	B&R Environmental/Tetra Tech NUS
Norman Richards	Mohegan Tribe
Susan Orrill	RAB Co-Chair Member
Larry Gibson	RAB Member
Deborah Downie	RAB Member
Janice Peret	Subbase PAO
Bart Pearson	Community
Noah Levine	Community

The attendance sheet is included as Attachment 1.



### **Welcome and Introduction**

Jeff Sullivan opened the meeting at 6:30 p.m. He reviewed the prior meeting minutes.

Corey Rich gave a presentation on the Remedial Investigation at the Lower Subbase, New London (See Attachment 2). Corey Rich presented the Navy's preliminary findings and recommendations. Currently, there is a draft report that's under review by the regulators, and the comments haven't been received yet. The Navy will be addressing the comments from the regulators within the next month or so.

Norman Richards asked what the parameters were analyzed for to determine if natural attenuation is occurring.

Corey Rich stated that they collected water quality parameters such as pH, REDOX potential, and dissolved oxygen. REDOX potential and dissolved oxygen are used primarily to determine if groundwater is anaerobic or aerobic. The groundwater samples were also analyzed for methane, sulfate, nitrate, and phosphate. The methane results tell you if methanogenesis is occurring, and that only occurs under anaerobic conditions. Natural attenuation processes are occurring.

Norman Richards asked if they looked at any of the individual petroleum hydrocarbons that are known to exist in the marine environment.

Corey Rich stated, yes. The analysis that was done for the groundwater would have picked up the particular compounds that were in the groundwater itself. A specific SVOC analysis was done. The petroleum products that could have leaked were particularly number 2 or 6 fuel oils. In those types of fuel oils volatiles are not common, but semi-volatiles are. Historical information was used to gather that information. The information was used to guide the additional analyses that needed to be done under the investigation.

Deborah Downie stated that Corey mentioned that not much lead was found in the soil but some was found in the groundwater. Deborah asked why it's higher in the groundwater. She asked if it is because of the concentrations or is it coming from somewhere else.

Corey Rich stated, maybe. It's typical that you would expect to see something in the soils. Historically, the sources have been petroleum products in that area.

Mark Evans stated that maybe cross contamination from the other zones was responsible.

Deborah Downie asked if you would look at that in the groundwater monitoring.

Corey stated, yes.

Norman Richards asked what the pH of the groundwater was.



Corey Rich stated that in most cases it was 6.8 to 7.5, which is normal. The only unique situation that was seen in the vicinity of the power plant was that the underground steam lines are in contact with the groundwater.

Noah Levine asked if that area was affected by the tides.

Corey Rich stated, yes. They took water levels during high and low tide to see the impact.

Noah Levine asked if all the other parameters were measured.

Corey Rich stated they did detect minor concentrations of salinity.

Deborah Downie questioned that in Zone 4 it was recommended that there would be no future treatment with the soils because of the previous remedial effort.

Corey Rich stated that they show no health risks. It showed some carcinogenic risks to a future resident, but the Navy will maintain that site.

Sue Orrill stated that samples were taken previously. She asked how these samples compared to the groundwater samples that were taken.

Corey Rich stated that previous remedial efforts seem to be helping that area. They excavated a majority of the base of the building and along the outer side. They removed a majority of the contamination by excavation. There is peripheral contamination outside of the building, but groundwater concentrations were much lower.

Noah Levine asked how far back does the historical data go?

Corey Rich stated about ten years.

Noah Levine asked if it is getting worse or staying the same as far as the migration in Zone 4.

Corey Rich stated that there has been different analytical programs completed by each contractor that has worked out there. For the most part it seems that contaminant migration is decreasing overall. For the proposed groundwater monitoring program, the historical data will be used with newly collected data to complete a trend analysis analyses. The proposed program will most likely include quarterly sampling and a similar analytical program so there aren't changes in detection limits. Historical sampling programs used different analytical methods and had different detection limits.

Sue Orrill asked if Sites 1 through 4 are a part of the computerized system, the GIS.

Corey Rich stated that all 7 zones have been incorporated into the GIS, and he brought more disks to the Activity and the Navy so they have the latest information available. They haven't



been able to develop a web site for public access to date, but that's something that the Navy is going to work on.

Mark Evans stated that the off-site wells are on the GIS system, but the analytical data is not in the system yet.

Sue Orrill asked about the lead in Zone 5, Building 175, which was a building that stored spent acid.

Corey Rich stated they didn't detect lead. Generally, just petroleum products were detected around the location of a former UST (underground storage tank) that was removed and replaced with an AST (above ground storage tank). It doesn't seem like the UST or the tanks used to store the spent acid contributed any lead contamination to the soil.

Noah Levine stated he assumed the soil-sampling region had some background samples for Zone 5. He asked if that was how it was determined if there were background levels of metals.

Corey Rich stated, yes. For this particular zone we had up-gradient background levels. Atlantic Environmental had done some background sampling too. Those results were used. That report was sent out in May '94 or '95 so they came up with acceptable background levels for metals for the SUBASE in general, and those were used across the SUBASE.

Noah Levine asked if any PCBs were found in Zone 7 where the transformers were.

Corey Rich stated that the previous sampling that was done did not detect any PCBs.

Deborah Downie asked where the lead came from.

Corey Rich stated that they may have stored batteries in that vicinity at one time. The highest hits were seen in samples collected from underneath the big parking lot.

Patti Tyler asked how high were the hits.

Corey Rich stated 189,000 mg/kg. There were some other things that could have contributed to that. They found lead shot which was used for ballast in the submarines and sometimes you may pick that up in the soils. That was seen up around Zone 5 or 6.

Noah Levine asked based on those programs that you had, how did they implement the geostatistical modeling of this area. It wasn't homogeneous distribution of these constituents.

Corey Rich stated that if your data is heterogeneous the standard deviation of the data is not that good. You have a high peak in your data and everything around it is low. You're going to get a tight pattern of a high hit at that particular location.

Noah Levine stated that you couldn't extrapolate very far.



Corey Rich stated that if it's homogeneous and you have a distribution, the geostatistics doesn't help if you have a high hit.

Noah Levine asked if they got a lot of these.

Corey Rich stated that Zone 7 was the worst. It was the maximum hit that was seen. The general range has been much smaller. Most of the hits are about fifty to one hundred.

Norman Richards asked what are the criteria that would lead to a low risk to ecological receptors.

Patti Tyler stated low is based on a hazard quotient. You would take your environmental concentration and divide it by the criteria. Low typically indicates a hazard quotient of one to ten.

Corey Rich stated all hazard quotients are below twelve. Moderate is around twelve.

#### **Future Meeting Date/Time**

Next meeting will be August 5, 1998 at 6:30 p.m.

#### **Meeting Adjourned**

Meeting adjourned at 7:40 p.m.

**ATTACHMENT 1**

# RAB Meeting

5/6/98

SUBASE NLON

## Attendee Roster

<u>Name</u>	<u>Representing</u>	<u>Phone</u>
Dick Conant ✓	Subase Environ Dept.	
ANDREW STACKPOLE ✓	"	
Kymberlee Teekla ✓	USEPA	
Norman Richards ✓	Mohegan Tribe	
Mark Lewis ✓	Conn. DEP	
Corey Rich ✓	Tetra Tech	
Patti Tyler ✓	USEPA	
Noah Levine ✓	RESIDENT, New London	
JANICE PERET ✓	Subase PAO	
Larry Gibson ✓	RAB member	
BART M. PEARSON ✓	PUBLIC	
Sue Orrell ✓	1292 ROUTE 12, GROTON, CT 06340	
Jeff Sullivan	co-chair RAB	
Greta	7 Pinelock Dr; Gales Ferry, CT	
MARK EVANS	SUBASE Environmental	
	NDiv	
	NDiv	

Jul 29

Aug 5, 1998

**ATTACHMENT 2**



**LOWER SUBBASE RI PRESENTATION  
NSB-NLON, GROTON, CONNECTICUT**

**RESTORATION ADVISORY BOARD MEETING  
MAY 6, 1998**

**BY BROWN & ROOT ENVIRONMENTAL**

# **LOWER SUBASE RI**

## **Background Information**

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- ◆ **A total of 19 investigations have been conducted in the Lower Subase and Thames River over the past 18 years under several programs (IRP, UST, etc.).**
- ◆ **Major investigations include the Phase I and II RIs and Pier 33/Berth 16 SI.**
- ◆ **Data from previous investigations were combined and evaluated in the Existing Data Summary Report. Data gaps were identified which allowed the scope of the RI to be developed.**

# **LOWER SUBBASE RI**

## **Project Objectives**

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- ◆ **Define the nature and extent of contamination in zone-specific soil and groundwater and in the sediment of the Thames River.**
- ◆ **Identify/Verify source(s) of soil and groundwater contamination.**
- ◆ **Define the major contaminant migration pathways**
- ◆ **Provide supplemental data to develop revised human health and ecological risk assessments and to develop appropriate remedial alternatives**

# **LOWER SUBASE RI**

## **Summary of Field Program**

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- ◆ **48 Test Borings (34 Direct Push and 14 Hollow Stem Augering)**
- ◆ **14 Monitoring Wells**
- ◆ **96 Soil Samples**
- ◆ **49 Groundwater Samples/Water Levels from New and Existing Wells**
- ◆ **20 Sediment Samples**
- ◆ **40 Surface Water (shallow and deep)**

# **LOWER SUBBASE RI**

## **Summary of Analytical Program**

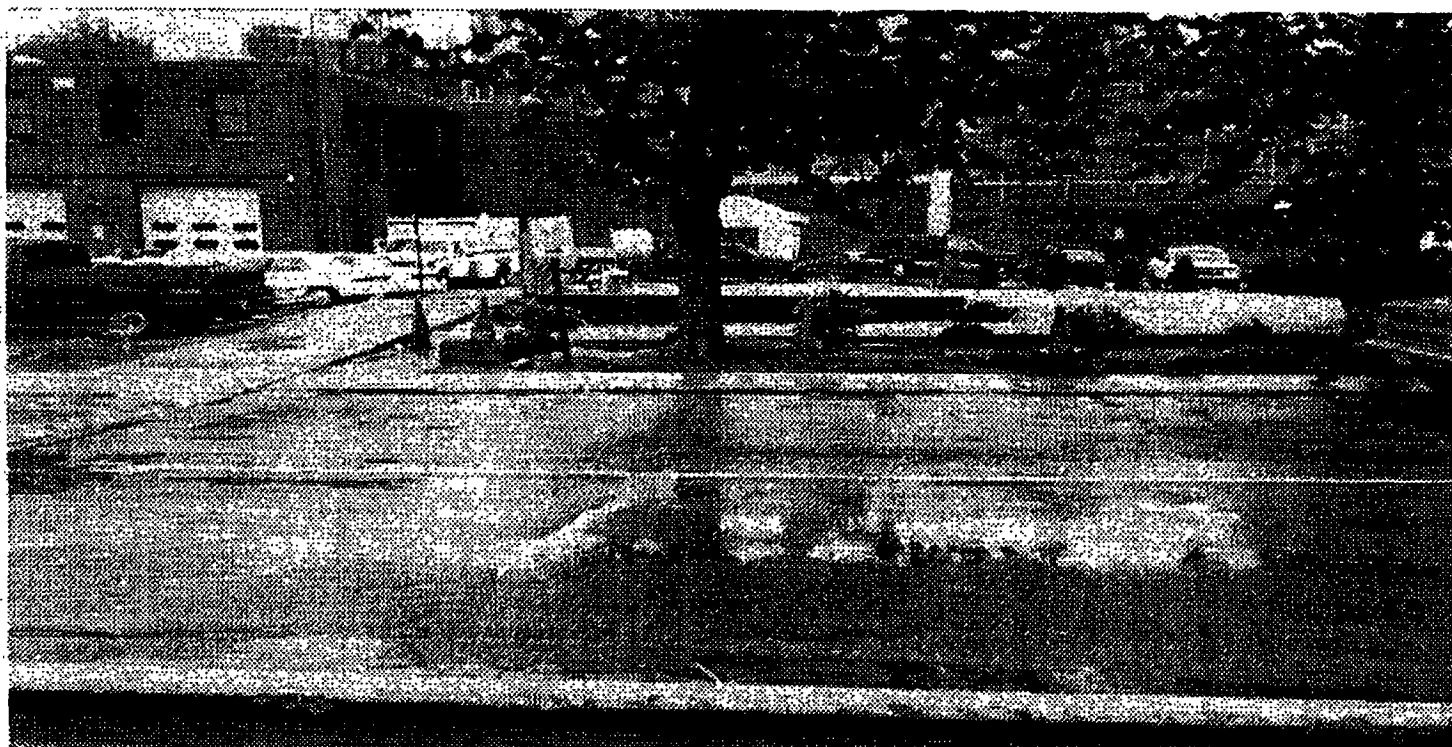
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- ◆ **Soil - VOCs, SVOCs, TPH, Metals, and SPLP (TAL metals or lead)**
- ◆ **Groundwater - VOCs, SVOCs, TPH, Metals (total & dissolved), natural attenuation parameters, water quality**
- ◆ **Sediment - SVOCs, Metals, AVS/SEM, pH, TOC, and grain size**
- ◆ **Surface Water - Water Quality**

# **LOWER SUBBASE RI**

## **Zone 1**

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**SITE 10 - FUEL STORAGE TANKS E, F, G, H , L and TANK 54-H  
FACING EAST**

# LOWER SUBBASE RI

## Zone 1

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**SITE 11 - POWER PLANT OIL TANKS A, B, C, D  
FACING SOUTH**

# **LOWER SUBBASE RI**

## **Zone 1 - Summary**

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- ◆ **Nature & Extent of Contamination**
  - **SVOCs, TPH, and metals in shallow and deep soil**
  - **TPH and metals in groundwater**
- ◆ **Contaminant Fate and Transport**
  - **Migration of PAHs and metals (mainly lead)**
  - **Natural Attenuation processes occurring**
- ◆ **Human Health Risks**
  - **RME - Cnst. Wrkr. (NC), F-T Emp. (C), Future Resident (C)**
  - **CTE - Acceptable**
- ◆ **Ecological Risks in Thames River**
  - **Minor risks to ecological receptors**



# **LOWER SUBBASE RI**

## **Zone 1 - Recommendations**

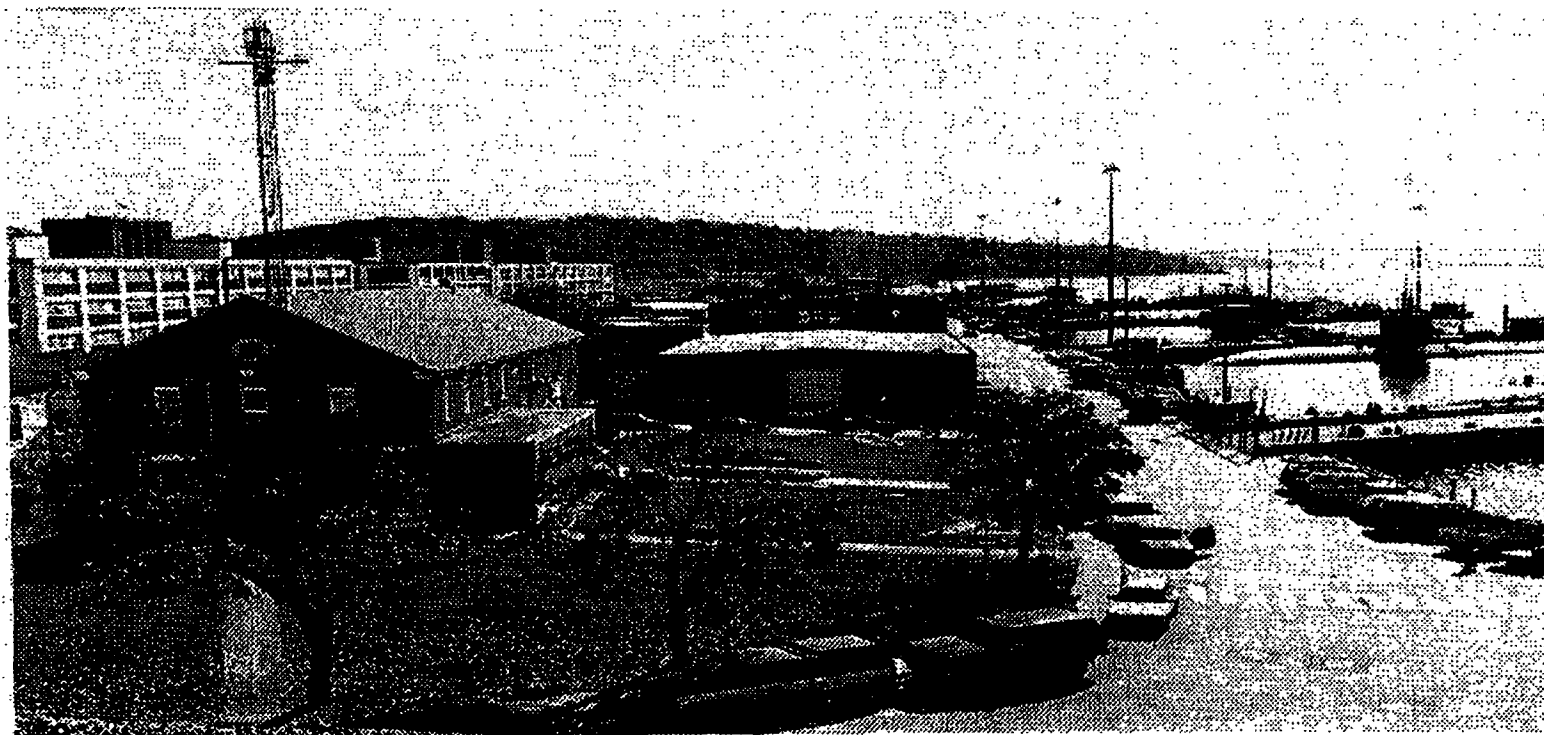
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- ◆ **Proceed to a Feasibility Study to evaluate remedial alternatives for soil**
- ◆ **Conduct a Tiered Groundwater Monitoring Program**

# **LOWER SUBASE RI**

## **Zone 2**

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**INTERSECTION OF CORVINA ROAD & ALBACORE ROAD  
FACING SOUTH**

# **LOWER SUBBASE RI**

## **Zone 2 - Summary**

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- ◆ **Nature & Extent of Contamination**
  - **SVOCs, TPH, and metals in shallow and deep soil**
  - **Infrequent detections of metals and SVOCs in groundwater**
- ◆ **Nat. Attn./Contaminant Migration**
  - **Migration from soil to groundwater generally not occurring**
  - **Natural attn. viable, but no groundwater contamination**
- ◆ **Human Health Risks**
  - **RME - Acceptable**
  - **CTE - Acceptable**
- ◆ **Ecological Risks in Thames River**
  - **Minor Risks to Ecological Receptors**

# **LOWER SUBBASE RI**

## **Zone 2 - Recommendations**

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- ◆ **No Further Action is recommended for soil**
- ◆ **Conduct a Tiered Groundwater Monitoring Program**

# **LOWER SUBASE RI**

## **Zone 3**

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**SITE 17 - HAZARDOUS MATERIALS/SOLVENTS STORAGE AREA (BUILDING 31)**  
**FACING NORTHEAST**

# **LOWER SUBBASE RI**

## **Zone 3 - Summary**

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- ◆ **Nature & Extent of Contamination**
  - **SVOCs, TPH, and metals (lead) detected in shallow and deep soil**
  - **Metals (lead) detected in groundwater**
- ◆ **Nat. Attn./Contaminant Migration**
  - **Metals (lead) may be migrating from soil to groundwater**
  - **Natural attenuation processes occurring**
- ◆ **Human Health Risks**
  - **RME - Future Resident (C)**
  - **CTE - Acceptable**
- ◆ **Ecological Risks in Thames River**
  - **Minor risks to ecological receptors**

# **LOWER SUBASE RI**

## **Zone 3 - Recommendations**

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- ◆ **No Further Action is recommended for soil**
- ◆ **Conduct a Tiered Groundwater Monitoring Program**

# LOWER SUBBASE RI

## Zone 4

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**SITE 19 - SOLVENT STORAGE AREA (BUILDING 316)  
FACING SOUTH**



# LOWER SUBBASE RI

## Zone 4

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**QUAY WALL STUDY AREA  
FACING SOUTH**

# **LOWER SUBBASE RI**

## **Zone 4 - Summary**

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- ◆ **Nature & Extent of Contamination**
  - **PAHs, TPH, and metals (lead) in shallow and deep soil**
  - **Metals (lead) detected in groundwater**
- ◆ **Nat. Attn./Contaminant Migration**
  - **Metals (lead) and few SVOCs may be migrating from soil to gw**
  - **Natural attenuation processes occurring**
- ◆ **Human Health Risks**
  - **RME - Full-Time Employee (C) and Future Resident (C)**
  - **CTE - Acceptable**
- ◆ **Ecological Risks in Thames River**
  - **Low to moderate risks to ecological receptors**

# **LOWER SUBASE RI**

## **Zone 4 - Recommendations**

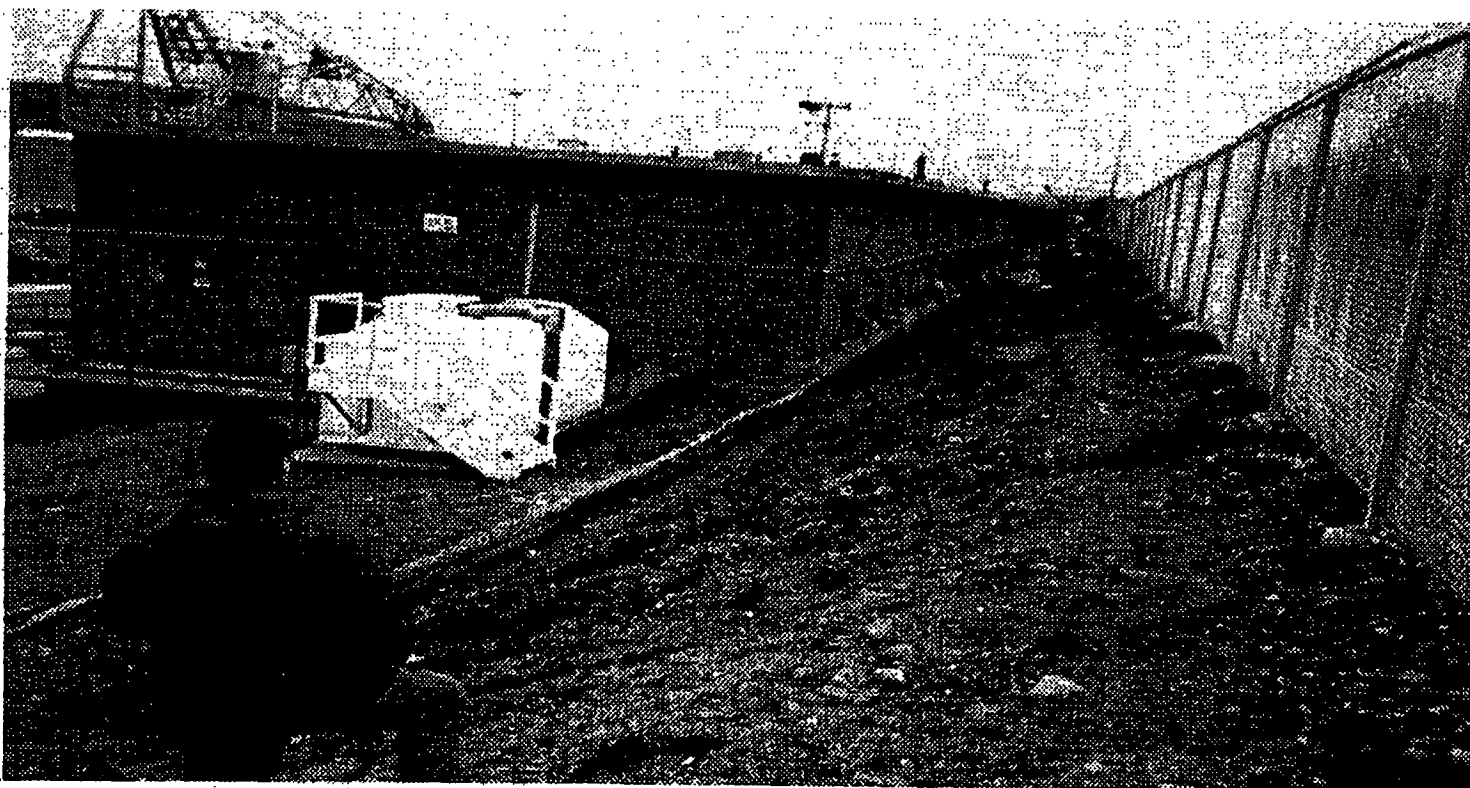
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- ◆ **Proceed to a Feasibility Study to evaluate remedial alternatives for soil**
- ◆ **Conduct a Tiered Groundwater Monitoring Program**

# **LOWER SUBBASE RI**

## **Zone 5**

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**SITE 22 - PIER 33/BUILDING 175 (FORMER ACID STORAGE AREA)  
FACING NORTH**

# **LOWER SUBBASE RI**

## **Zone 5**

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**SITE 22 - PIER 33/BUILDING 175 (FORMER ACID STORAGE AREA)  
FACING SOUTH**

# **LOWER SUBBASE RI**

## **Zone 5 - Summary**

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- ◆ **Nature & Extent of Contamination**
  - **SVOCs and TPH detected in shallow and deep soil**
  - **Minor detections of PAHs and metals in groundwater**
- ◆ **Nat. Attn./Contaminant Migration**
  - **Possible migration of PAHs and metals**
  - **Natural attenuation processes occurring**
- ◆ **Human Health Risks**
  - **RME -**
  - **CTE -**
- ◆ **Ecological Risks in Thames River**
  - **Minor risks to ecological receptors**

# **LOWER SUBBASE RI**

## **Zone 5 - Recommendations**

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- ◆ **No Further Action is recommended for soil**
- ◆ **Conduct a Tiered Groundwater Monitoring Program**

# **LOWER SUBASE RI**

## **Zone 6 - Summary**

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- ◆ **Nature & Extent of Contamination**
  - **TPH and SVOCs in shallow and deep soil**
  - **Low levels of SVOCs and metals in groundwater**
- ◆ **Nat. Attn./Contaminant Migration**
  - **Metals may be migrating from soil to groundwater**
  - **Natural attenuation processes occurring**
- ◆ **Human Health Risks**
  - **RME - Acceptable**
  - **CTE - Acceptable**
- ◆ **Ecological Risks in Thames River**
  - **Minor risks to ecological receptors**



# **LOWER SUBASE RI**

## **Zone 6 - Recommendations**

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- ◆ **No Further Action is recommended for soil**
- ◆ **Conduct a Tiered Groundwater Monitoring Program**

# **LOWER SUBBASE RI**

## **Zone 7**

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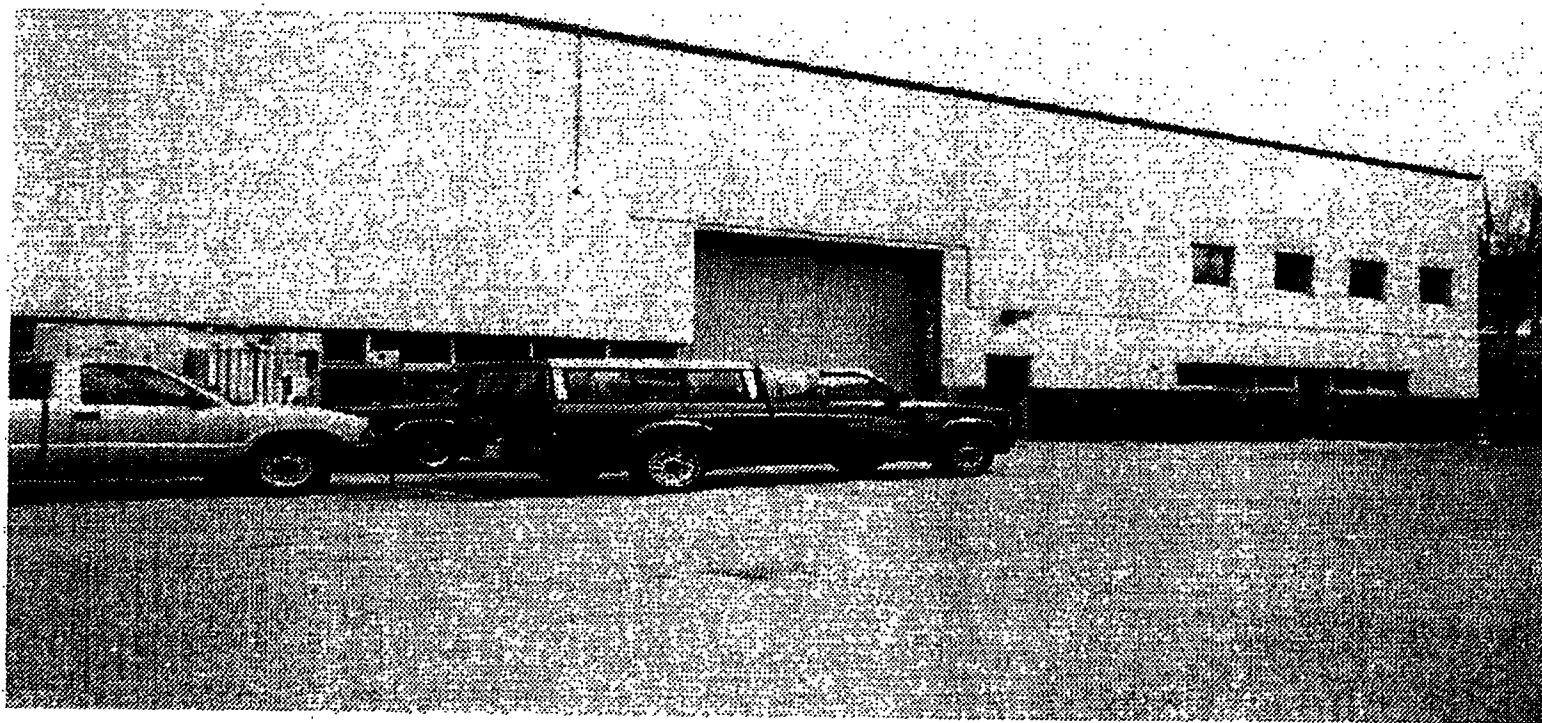
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**SITE 21 - BERTH 16**  
**FACING EAST**

# **LOWER SUBASE RI**

## **Zone 7**

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**SITE 25 - CLASSIFIED MATERIALS INCINERATOR  
FACING NORTHEAST**

# **LOWER SUBBASE RI**

## **Zone 7**

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**TRANSFORMERS AT BUILDING 157 VAULT 31  
FACING SOUTH**

# **LOWER SUBBASE RI**

## **Zone 7 - Summary**

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- ◆ **Nature & Extent of Contamination**
  - PAHs, TPH and lead detected in shallow and deep soil
  - Lead detected in groundwater
- ◆ **Nat. Attn./Contaminant Migration**
  - Lead is migrating from soil to groundwater
  - Natural attenuation processes are occurring
- ◆ **Human Health Risks**
  - RME - Const. Wrk (NC), F-T Empl. (C), Fut. Rsd. (C)
  - CTE - Acceptable
- ◆ **Ecological Risks in Thames River**
  - Low to moderate risks to ecological receptors

# **LOWER SUBASE RI**

## **Zone 7 - Recommendations**

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- ◆ **Proceed to a Feasibility Study to evaluate remedial alternatives for soil**
- ◆ **Conduct a Tiered Groundwater Monitoring Program**